Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

student likes to have an exact statement of just what he is to learn. This is unfortunate, and not altogether the fault of the teacher. The teacher who omits a chapter from a book is apt to be looked upon with suspicion as a *franc-tireur,* or it may be darkly hinted that he does not understand the chapter well enough to teach it. If it should turn out that there is a large demand for this book the reviewer will take it as a sign that the teacher of mathematics is learning to be less dependent on his textbook. In any event the book will be found in the library of every progressive teacher of algebra.

D. N. Lehmer.

University of California.

PROBLEMS FOR SOLUTION.

Send all communications about problems to B. F. Finkel, Springfield, Mo.

ALGEBRA.

481. Proposed by ROGER E. MOORE, University of Wisconsin.

Show that if the coefficients in the binomial expansion of $(a - b)^n$ (n being a positive integer) be multiplied each to each by the corresponding terms of an arithmetical progression of $(n + 1)$ terms, then the algebraic sum of the $(n + 1)$ products will be zero.

482. Proposed by C. F. GUMMER, Kingston, Ontario.

Find the necessary and sufficient condition that the infinite sequences of positive quantities $(a_1, a_2, \cdots)$ and $(b_1, b_2, \cdots)$ may be such that the series $a_1x_1 + a_2x_2 + \cdots$ and $b_1x_1 + b_2x_2 + \cdots$ either both converge or both diverge when the x's are any positive quantities.

GEOMETRY.

510. Corrected statement (given incorrectly in the March issue).

Show how to find the equation of a line perpendicular to a side of the triangle of reference and passing through a given point, in a system of homogeneous coördinates, using the condition that two lines be parallel in this system but not the condition that two lines be perpendicular. Illustrate the method by using it to find the trilinear coördinates of the points of contact of an escribed circle of the triangle.

514. Proposed by VINCENTE MILLS, Manila, P. I.

Given an equilateral triangle, the length of the sides being unknown, and a point within, the distances from which to the vertices are given, required the length of a side of the triangle and the angles subtended at the given point by the sides of the triangle.

515. Proposed by C. F. GUMMER, Kingston, Ontario.

Show how to cut up a square carpet and make it into three equal square carpets. Estimate the total length of seam in comparison with a side of the original carpet.

CALCULUS.

429. Proposed by N. P. PANDYA, Sojitra, India.

Trace the curve given by the solution of

$$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} = \frac{dy}{dx} + \frac{1 - 4x^2}{(1 - x^2)^{3/2}}.$$

430. Proposed by G. PAASWELL, New York City.

Revolve a circle about a chord (not a diameter). Select a system of rectilinear coördinates with this chord as one axis and the origin as the intersection of the chord and the circumference. Term this axis the z axis and pass a plane through the x (or y) axis. Find the area of this surface intercepted by this plane and the xz (or yz) plane.

MECHANICS.

346. Proposed by WILLIAM HOOVER, Columbus, Ohio.

Half the length of one of the equal parts of a uniform heavy string resting in equilibrium over a smooth horizontal indefinitely thin peg is cut off; determine the instantaneous change in the pressure on the peg.

347. Proposed by E. B. ESCOTT, Kansas City, Missouri.

A cord $ABCD$ is suspended from points A and D, which are 20 feet apart in horizontal distance. D is 4 feet lower than A. At B and C are suspended weights of 100 and 200 lbs. $AB = 8$ feet, $BC = 10$ feet, and $CD = 12$ feet. Find angles α, β, γ made by AB, BC, and CD, respectively, with the horizontal. Also find tensions T_1, T_2, and T_3 in AB, BC, and CD.

NUMBER THEORY.

265. Proposed by J. W. NICHOLSON, Louisiana State University.

If the roots of $x^4 - ax^2 + bx + c = 0$ are rational, prove that $4(a + yz) - 3(y + z)$ is a perfect square, y and z being any two roots of the equation.

245. Proposed by NORMAN ANNING, Chilliwack, B. C.

Show that $x^2 + y^2 = (a_1a_2\cdots a_n)^n$ has $4(n + 1)^m$ solutions in integers, in 2^{m+2} of which x and y are relatively prime, the a's being primes of the form $4k + 1$ and n a positive integer.

Note.—The proposer of this problem has changed it to read as above instead of the statement as previously published in the May, 1916, issue.

SOLUTIONS OF PROBLEMS.

ALGEBRA.

469. Proposed by T. H. GRONWALL, New York City.

Show that the equation

$$f(x) \equiv 2ax^4 + (1 - b)x^3 + b(1 - b)x - 2ab = 0,$$

where $0 < b < 1$, $a > 0$ and $a^2 > b$, has only one positive root and that it lies between the roots of

$$g(x) \equiv x^2 - 2ax + b = 0.$$

Solutions By D. R. Curtiss, Northwestern University.

I. By Descartes' Rule of Signs, $f(x)$ has only one positive root. Let x_1 be the smaller of the two roots of $g(x) = 0$, and x_2 be the larger. We shall have solved the problem if we establish the inequalities

$$f(x_1) < 0, \qquad f(x_2) > 0. \tag{1}$$

Let us now give b a constant value and let a vary from $\sqrt{b}$ to ∞. If X is either x_1 or x_2 we shall have $g(X) = X^2 - 2aX + b = 0$, and by differentiating with respect to a we obtain

$$\frac{dX}{da} = \frac{X}{X - a}. \tag{2}$$

We now have

$$\frac{df(X)}{da} = f'(X)\frac{dX}{da} + 2(X^4 - b) = \frac{f'(X)\cdot X + 2(X - a)(X^4 - b)}{X - a}$$